

What Is Claimed Is:

1. An isolated tumor associated antigen peptide of eight to ten amino acid residues, which is capable of promoting effective binding to a MHC class I molecule to elicit a CTL response and which:

(A) is obtainable from a protein encoded by a polynucleotide overexpressed in human colon carcinoma cells;

(B) is derived from (A);

(B) has an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, and SEQ ID NO:55, and

wherein said peptide optionally includes at least one non-natural modification.

2. The peptide of claim 1, which is obtainable from a protein encoded by a polynucleotide overexpressed in human colon carcinoma cells.

3. The peptide of claim 2, wherein the second residue from the N-terminus of said peptide and the C-terminal residue of said peptide are (1) hydrophobic or hydrophilic or (2) neutral, hydrophobic or aliphatic natural amino acid residues.

4. The peptide of claim 2, wherein said protein is encoded by a polynucleotide coding sequence of human 1-8D interferon inducible gene.

5. The peptide of claim 4, wherein said polynucleotide coding sequence comprises nucleotides 31-426 of SEQ ID NO:58.

6. The peptide of claim 4, wherein said polynucleotide coding sequence comprises SEQ ID NO:60.

7. The peptide of claim 4 which has the amino acid sequence of SEQ ID NO:27.

8. The peptide of claim 2, which has an amino acid sequence selected from the group consisting of SEQ ID NO:16, SEQ ID NO:20, SEQ ID NO:21, and SEQ ID NO:22.

9. The peptide of claim 1, which is derived from a protein encoded by a polynucleotide overexpressed in human colon carcinoma cells, wherein when the second residue from the N-terminus of said peptide and the C-terminal residue of said peptide are neutral, hydrophobic or aliphatic natural amino acid residues, they are replaced with neutral, hydrophobic or aliphatic non-natural amino acid residues.

10. The peptide of claim 1, which has an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, and SEQ ID NO:55.

11. The peptide of claim 10, which has the amino acid sequence of SEQ ID NO:41.

12. The peptide of claim 1, wherein said MHC class I molecule is HLA-A2.1.

13. The peptide of claim 1, which includes at least one non-natural modification.

14. The peptide of claim 13, wherein said at least one non-natural modification is selected from the group consisting of a peptide modification, a semi peptide modification, a cyclic peptide modification, a N-terminus modification, a C-terminus modification, a peptide bond modification, a backbone modification, and a residue modification.

15. A pharmaceutical composition for treating or for inhibiting the development of colon or prostate cancer, comprising a pharmaceutically acceptable carrier, excipient, diluent or auxiliary agent and, as an active ingredient, at least one peptide of claim 1.

16. The pharmaceutical composition of claim 15, further comprising a helper peptide.

17. The pharmaceutical composition of claim 16, wherein said helper peptide contains a T helper epitope.

18. The pharmaceutical composition of claim 15, wherein the cancer is a carcinoma.

19. The pharmaceutical composition of claim 15, which is a vaccine composition.

20. The vaccine composition of claim 19, wherein said pharmaceutically acceptable carrier is selected from the group consisting of a proteinaceous carrier to which at least one peptide is linked, an adjuvant, a protein, and an antigen presenting cell.

21. The vaccine composition of claim 20 which is a cellular vaccine composition, wherein the pharmaceutically acceptable carrier is an antigen presenting cell which presents said at least one peptide.

22. The cellular vaccine composition of claim 21, wherein said antigen presenting cell is selected from the group consisting of a dendritic cell, a macrophage, a B cell, and a fibroblast.

23. The cellular vaccine composition of claim 22, wherein said antigen presenting cell is caused to present said at least one tumor associated antigen peptide by a method selected from the group consisting of:

- (A) genetically modifying said antigen presenting cell with at least one polynucleotide encoding said at least one tumor associated antigen peptide such that said peptide or at least one polypeptide which comprises said peptide is expressed;

- (B) loading said antigen presenting cell with at least one polynucleotide encoding said at least one tumor associated antigen peptide;
- (C) loading said antigen presenting cell with said at least one tumor associated antigen peptide; and
- (D) loading said antigen presenting cell with at least one polypeptide comprising said at least one tumor associated antigen peptide.

24. A method for treating or for inhibiting the development of colon or prostate cancer, comprising administering an effective amount of the pharmaceutical composition of claim 15 to a patient in need thereof to treat or inhibit the development of colon or prostate cancer.

25. The method of claim 24, wherein said pharmaceutical composition is a vaccine composition.

26. An isolated polynucleotide encoding at least one peptide of claim 1.

27. The polynucleotide of claim 26, which further encodes a fused protein product from which said at least one peptide is cleavage by a protease.

28. A pharmaceutical composition for treating or for inhibiting the development of colon or prostate cancer, comprising the polynucleotide of claim 26 and a pharmaceutically acceptable carrier, excipient, diluent, or auxiliary agent.

29. The pharmaceutical composition of claim 28, which is a vaccine composition.

30. A pharmaceutical composition for treating or for inhibiting the development of colon cancer, comprising a pharmaceutically acceptable carrier, excipient, diluent, or

auxiliary agent, and an active ingredient, wherein said active ingredient is:

- (A) a tumor associated antigen (TAA) encoded by a human 1-8D interferon inducible gene;
- (B) at least one 8-10 residue TAA peptide of (A) with or without at least one non-natural modification;
- (C) a polynucleotide comprising the coding sequence of a human 1-8D interferon inducible gene; or
- (D) a polynucleotide encoding at least one peptide of (B).

31. The pharmaceutical composition of claim 30, wherein said active ingredient is a TAA encoded by a human 1-8D interferon inducible gene.

32. The pharmaceutical composition of claim 31, wherein said TAA comprises the amino acid sequence of SEQ ID NO:59.

33. The pharmaceutical composition of claim 31, wherein said TAA comprise the amino acid sequence of SEQ ID NO:61.

34. The pharmaceutical composition of claim 31, which is a vaccine composition.

35. The pharmaceutical composition of claim 30, wherein said active ingredient is at least one 8-10 residue TAA peptide of (A) with or without at least one non-natural modification.

36. The pharmaceutical composition of claim 35, wherein said TAA peptide includes at least one non-natural modification.

37. The pharmaceutical composition of claim 35, wherein said at least one non-natural modification is selected from the group consisting of a peptoid modification, a semi peptoid modification, a cyclic peptide modification, a N-

terminus modification, a C-terminus modification, a peptide bond modification, a backbone modification, and a residue modification.

38. The pharmaceutical composition of claim 35, further comprising a helper peptide.

39. The pharmaceutical composition of claim 38, wherein said helper peptide contains a T helper epitope.

40. The pharmaceutical composition of claim 35, wherein the cancer is a carcinoma.

41. The pharmaceutical composition of claim 35, which is a vaccine composition.

42. The vaccine composition of claim 41, wherein said pharmaceutically acceptable carrier is selected from the group consisting of a proteinaceous carrier to which at least one peptide is linked, an adjuvant, a protein, and an antigen presenting cell.

43. The vaccine composition of claim 42 which is a cellular vaccine composition, wherein the pharmaceutically acceptable carrier is an antigen presenting cell which presents said at least one peptide.

44. The cellular vaccine composition of claim 43, wherein said antigen presenting cell is selected from the group consisting of a dendritic cell, a macrophage, a B cell, and a fibroblast.

45. The cellular vaccine composition of claim 44, wherein said antigen presenting cell is caused to present said at least one tumor associated antigen peptide by a method selected from the group consisting of:

- (A) genetically modifying said antigen presenting cell with at least one polynucleotide encoding said at least one tumor associated antigen peptide such that said peptide or at least one

polypeptide which comprises said peptide is expressed;

- (B) loading said antigen presenting cell with at least one polynucleotide encoding said at least one tumor associated antigen peptide;
- (C) loading said antigen presenting cell with said at least one tumor associated antigen peptide; and
- (D) loading said antigen presenting cell with at least one polypeptide comprising said at least one tumor associated antigen peptide.

46. The pharmaceutical composition of claim 30, wherein said active ingredient is a polynucleotide comprising the coding sequence of human 1-8D interferon inducible gene.

47. The pharmaceutical composition of claim 46, wherein said coding sequence is nucleotides 31-426 of SEQ ID NO:58.

48. The pharmaceutical composition of claim 46, wherein said coding sequence is SEQ ID NO:60.

49. The pharmaceutical composition of claim 46, wherein said polynucleotide is an expression vector capable of expressing in a human host a TAA encoded by a coding sequence of human 1-8D interferon inducible gene.

50. The pharmaceutical composition of claim 46, which is a vaccine composition.

51. The pharmaceutical composition of claim 30, wherein said active ingredient is a polynucleotide encoding at least one TAA peptide of (B).

52. The pharmaceutical composition of claim 51, wherein said polynucleotide is an expression vector capable of expressing in a human host said at least one TAA peptide.

53. The pharmaceutical composition of claim 51, which is a vaccine composition.

54. A method for treating or for inhibiting the development of colon cancer, comprising administering an effective amount of the pharmaceutical composition of claim 30 to treat or inhibit the development of colon cancer.

55. The method of claim 54, wherein said pharmaceutical composition is a vaccine composition.

56. The method of claim 54, wherein the colon cancer is a carcinoma.

57. A method for treating or for inhibiting the development of colon cancer, comprising administering to a patient in need thereof a molecule which includes the antigen-binding portion of an antibody specific for the human 1-8D interferon induced transmembrane protein 2 to treat or inhibit the development of colon cancer in the patient.

58. A method for determining overexpression of human 1-8D interferon induced transmembrane protein 2 in human colon cells, comprising:

contacting a sample of colon cells from a patient with a molecule which includes the antigen-binding portion of an antibody specific for human 1-8D interferon induced transmembrane protein 2; and

detecting binding of the molecule to the colon cells and determining the level of expression of human 1-8D interferon induced transmembrane protein 2 by the colon cells from the patient sample.

59. An isolated polypeptide comprising the amino acid sequence of SEQ ID NO:61.

60. An isolated polynucleotide encoding the polypeptide of claim 59.



61. The polynucleotide of claim 60, comprising the nucleotide sequence of SEQ ID NO:60.